AMENDMENT(S) TO THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims on the application. All claims are set forth below with one of the following annotations.

- (Original): Claim filed with the application.
- (Currently amended): Claim being amended in the current amendment paper.
- (Canceled): Claim cancelled or deleted from the application. No claim text is shown.
- (Withdrawn): Claim still in the application, but in a non-elected status.
- (New): Claim being added in the current amendment paper.
- (Previously presented): Claim added or amended in an earlier amendment paper.
- (Not entered): Claim presented in a previous amendment, but not entered or whose entry status unknown. No claim text is shown.

1. (Currently amended) A radio receiver comprising:

a receive signal path including:

a filter;

a pre-filter section prior to the filter, the pre-filter section including at least one adjustable gain element to provide an adjustable gain to the pre-filter section; ~~and~~

at least one post-filter section after ~~to~~ the filter, including a first post filter section immediately after the filter, the post-filter ~~section~~ sections each including at least one adjustable gain element to provide an adjustable gain to the post-filter section;

a pre-filter signal strength detector coupled to the pre-filter section to measure the relative strength of the signal at a point in the receive signal path prior to filtering by the filter, the pre-filter signal

strength detector having an output coupled to a first analog-to-digital converter and a first calibrator to provide a first multi-bit calibrated measure of the relative strength of the signal at the prior-to-filtering point;

a first post-filter signal strength detector coupled to the first pre-filter section to provide a measure of the relative strength of the signal at a first post-filtering point in the receive signal path after filtering by the filter, the first post-filter signal strength detector having an output coupled to a second analog-to-digital converter and a second calibrator to provide a second multi-bit calibrated measure of the relative strength of the signal at the first post-filtering point; ~~and~~

an automatic gain controller (AGC controller) coupled to the outputs of first and second calibrators of the pre-filter and first post-filter signal strength detectors and further coupled to the variable gain elements to set the gains of the respective sections according to the pre-filter and first post-filter multi-bit calibrated signal strength measures, the setting being to respectively set the pre-filter signal strength and the first post-filter signal strength to a desired pre-filter signal power and a desired first post-filter signal power, respectively, the gains setting providing an overall gain setting for the receive ~~path,~~ path; and

a main analog to digital converter (ADC) configured to convert the output of the last analog section in the receiver signal path to a digital output signal,

such that the gain settings of the pre-filter and first post filter variable gain elements adapt to achieve the desired pre-filter and post-filter signal powers according to the signal characteristics, and take into account the amount of filtering provided by the filter, and

such that the gain settings of the pre-filter and first post filter variable gain elements does not require use of the digital output signal of the ADC.

2. (Currently amended) A receiver as recited in claim 1, wherein the ACG controller corrects and averages each of the pre-filter and first post-filter signal strength indications, compares the pre-filter and first post-filter corrected averaged signal strength indications to respective pre-filter and first post-filter desired signal powers, and adjusts the gains of the respective sections to reduce the differences between the corrected averaged indications and desired signal powers.

3. (Currently amended) A receiver as recited in claim 2, wherein the correction of the pre-filter and first post-filter signal strength indications is to bring the indications to a common scale so that the indications may be compared, and wherein the adjusting of the gains of at least one of the sections depends on both the pre-filter and first post-filter corrected and averaged signal strength indications.

4. (Currently amended) A receiver as recited in claim 2, wherein the ACG controller operates in sequential stages, each stage setting the gains of one ~~of~~ or more sections to achieve desired signal strength levels including the desired pre-filter signal strength level and a desired post-filter signal strength levels, the adjustment of each section being by a variable amount that depends on the calibrated measures of the relative strength.

5. (Currently amended) A receiver as recited in claim 4, wherein a first stage sets the gain of the pre-filter section according to the pre-filter signal ~~strength indications~~ strength indication and sets the gain of the first post filter section according to both the pre-filter signal strength indication and the first post-filter signal strength indication, and other stages finalize the gain setting of ~~the~~ any other post-filter sections, according to additional signal strength indications from the relevant sections.

6. (Currently amended) A receiver as recited in claim 1, wherein the receive signal path includes an RF section operating at RF and an intermediate frequency ~~(IF)~~ IF section after the RF section operating at an intermediate frequency, and wherein the filter is in the intermediate frequency section of the receive signal path.

7. (Currently amended) A receiver as recited in claim 1, wherein the desired pre-filter signal power and a desired post-filter signal power are selected in order to maximize the signal-to-noise-and-distortion at the end of the respective sections ~~receiver uses a direct conversion architecture such that the receive signal path includes an RF section operating at RF and direct downconversion from the RF section to a baseband section operating at baseband, and wherein the filter is in the baseband section, such that the one or more post-filter sections are in the baseband section~~.

8. (Currently amended) A receiver as recited in ~~claim 1, wherein the AGC controller is a digital controller, the receiver further includes one or more analog-to-digital converters to convert the pre-filter and post-filter signal strength indications to digital signals for input to the AGC controller~~ claim 5,

wherein the first post-filter signal strength detector is coupled to the first pre-filter section, and

wherein at least the first stage sets the gain of the pre-filter section and first post filter section to bring the input of the ADC to within the range of the ADC.

.9. (Currently amended) A receiver as recited in claim 6, wherein the receive signal path further comprises:

an analog to digital converter (ADC) configured to convert the output of the last analog ~~component~~ section in the receiver signal path to a digital output ~~signal;~~ signal,

wherein there are two or more post filter sections including a first post filter section and a second post filter section, the second post signal section including the analog to digital converter,

wherein the post-filter signal strength detector is coupled to the first pre-filter ~~section;~~ section,

wherein the digital signals from the ADC provide a measure of the signal strength post-digitization digitization to the AGC ~~controller;~~ controller, and

wherein the AGC controller is to set the gains of the pre-filter section, the first post-filter section, and the second post filter section according to the pre-filter and post-filter signal strength measures and the post-digitization signal strength measure.

10. (Original) A receiver as recited in claim 6, wherein the signal path includes a second filter between any variable gain element in the first post-filter section and any variable gain element in the second post-filter section, such that the gain setting takes into account the amount of filtering by the second filter in addition to the amount of filtering by the first filter.

11. (Currently amended) A method for controlling the gain of a radio receiver, the receiver having a receive signal path including

a filter;

a pre-filter section prior to the filter, the pre-filter section including at least one adjustable gain element to provide an adjustable gain to the pre-filter section; and

at least one post-filter section after ~~to~~ the filter, including a first post filter section immediately after the filter, the post-filter ~~section~~ sections each including at least one adjustable gain element to provide an adjustable gain to the post-filter section;

the method comprising:

accepting a ~~measure~~ first multi-bit calibrated measure of the pre-filter relative signal strength at a point in the receive signal path prior to filtering by the filter;

accepting a ~~measure~~ second multi-bit calibrated measure of the post-filter relative signal strength at a first post-filtering point in the receive signal path after the filtering by the filter;

setting the gains of the respective sections according to the first pre-filter and second post-filter signal strength multi-bit calibrated measures, the setting being to respectively set the pre-filter signal strength and the first post-filter signal strength to a desired pre-filter signal power and a desired first post-filter signal power, respectively, the gain setting providing an overall gain setting for the receive signal path;

analog to digital converting the output of the last analog section in the receiver signal path to a digital output signal,

such that the gain settings of the pre-filter and post filter variable gain elements adapt to achieve the desired pre-filter and post-filter signal powers according to the signal characteristics, and take into account for the amount of filtering provided by the filter, and

such that the gain setting of the pre-filter and first post filter variable gain elements does not require use of the digital output signal from the converting.

12. (Currently amended) A method as recited in claim 11, wherein the accepting of the measures includes calibrating the pre and first post-filter signal strength measures so that they may be compared.

13. (Currently amended) A method as recited in claim 11, wherein the accepting of the measures includes averaging each of the pre-filter and first post-filter signal strength measures, and wherein the setting of the gains

includes comparing the pre-filter and first post-filter corrected averaged signal strength measures to respective pre-filter and first post-filter desired signal powers, and adjusting the gains of the respective sections to reduce the differences between the corrected averaged measures and the respective desired signal powers.

14. (Currently amended) A method as recited in claim 13, wherein the setting of the gains of at least one of the sections depends on both the pre-filter and first post-filter corrected averaged signal strength measures to account for the amount of filtering provided by the filter.

15. (Currently amended) A method for controlling the gain of a radio receiver for receiving packets of information, the receiver connected to an antenna subsystem, the ~~receiver's~~ receiver including a receive signal path including a plurality of sections including a first section coupled to the antenna subsystem ~~and a~~, a next section, and an analog-to-digital converter (ADC) coupled to the output of the last analog section in the receiver signal path to output a digital output signal, each section having an adjustable gain, each section able to provide a multi-bit calibrated measure of the signal strength at its output; the method comprising:

waiting for a start of packet indication;

providing multi-bit calibrated measures of the signal strengths at the outputs of the first and the next sections; and

adjusting the gains of the first and the next sections using the provided measures of signal strength, the adjusting being to respectively set the signal strength at respective outputs of the sections to respective desired levels, in order to set the overall gain of the receive signal path,

such that the gain adjusting of at least the first section does not require use of the digital output signal from the ADC.

16. (Original) A method as recited in claim 15, further comprising setting the gains of the sections to a default level prior to waiting for a start of packet indication.

17. (Currently amended) A method as recited in claim 15,

wherein the receiver includes a filter in the receive signal path, the providing a measure of the signal strength at the output of the first section being at a point before the filter, and the providing a measure of the signal strength at the output of the next section being at a point after the filtering, the method further comprising:

correcting the provided measures of signal strength ~~at the~~ at the outputs of the first section and next section to determine measures on a common scale such that the corrected measures may be compared,

wherein the gain adjusting adjusts at least one of the first or next section's gain according to both the provided measure of signal strength at the output of the first section and at the output of the ~~first~~ next section.

18. (Currently amended) A method as recited in claim 15, wherein gain adjusting of the sections is carried out sequentially in respective sequential AGC stages, each sequential stage adjusting the gain of one or more corresponding sections, each stage including:

providing a measure of the signal strengths at the ends of the corresponding sections; ~~and~~

comparing the provided calibrated measures of ~~signals strength~~ signal strengths at the ends of the corresponding sections to a desired signal strength level for each corresponding section; and

adjusting the gain of the corresponding sections ~~according to~~ by a variable amount that depends on the respective differences between the desired levels and the provided calibrated measures of signal strength for the respective corresponding sections.

19. (Original) A method as recited in claim 18, wherein the providing the measures of the signal strengths at the ends of the sections includes calibrating so that the measures may be compared.

20. (Original) A method as recited in claim 19,

wherein the receiver includes a filter in the receive signal path, the providing a measure of the signal strength at the output of the first section being at a point before the filter, and the providing a measure of the signal strength at the output of the next section being at a point after the filtering, and

wherein the desired level of at least one of the sections depends on both the provided measure of signal strength at the output of the first section and at the output of the next section such that the gain adjusting accounts for the amount of filtering by the filter.

21. (Currently amended) A method as recited in claim 18, wherein each gain adjusting stage finalizes the gain of one corresponding section, such that the providing the signal strength measure and the adjusting of the first section's gain is carried out during a first AGC stage, the finalizing of the adjusting of the second section's gain is ~~carrier~~ carried out during a second AGC stage, respectively, and wherein the method comprises for each stage and corresponding section:

providing a measure of the signal strengths at the end of the sections; ~~and~~

comparing the provided measure of signal strength at the end of the corresponding section to a desired signal strength level for the corresponding section; and

adjusting the gain of the corresponding section ~~according to~~ by a variable amount that depends on the difference between the desired level and the provided measure of signal strength for the corresponding section.

22. (Original) A method as recited in claim 18, wherein the radio is for operation in a wireless network conforming to the IEEE 802.11 standard.

23. (Original) A method as recited in claim 18, wherein the ACG controller takes approximately 1 to 2 μs for each AGC stage.

24. (Currently amended) A method as recited in claim 18,

wherein the receiver is a superheterodyne receiver that includes in its receive signal path a first downconverter to convert a received signal at RF to an IF signal, a second downconverter to convert the IF signal to baseband, and a filter at IF between the first and second downconverters, the receive signal part further including a filter in the IF part,

wherein the receive signal path is including a pre-filter section before the filter, a post filter section after the filter, and a third section after the post-filter section,

wherein the plurality of AGC stages includes three stages, the first stage including setting the gain of at least the pre-filter section, the second stage including setting the gain of the post-filter section, and the third stage including setting the gain of the third section.

25. (Currently amended) A method as recited in claim 24,

wherein the providing of the measure of signal strength for the pre-filter and post-filter stages includes for each stage providing a measure of the

respective signal strength in a logarithmic scale, converting the respective measured signal strength to digital signal strength samples, correcting and averaging a respective set of the digital signal strength samples to produce pre-filter and post-filter signal strength measurements, respectively, to compare to the desired values in the respective comparing steps, and

wherein the providing the measure of signal strength for the third stage includes providing a baseband output of the third section, using the ADC to ~~converting~~ convert the baseband output of the third section to digital samples of the digital output signal, converting the digital samples to digital signal strength samples in a logarithmic scale, correcting and averaging a set of the logarithmic-scale digital signal strength samples to produce a third signal strength measurement to compare to the desired value in the comparing step of the third stage.

26. (Original) A method as recited in claim 18, wherein the receiver is coupled to a two antennas via a diversity switch; the method further comprising in one of the AGC stages selecting the antenna to use according to at least one of the provided measurements of signal strength.

27. (Original) A method as recited in claim 26, wherein the determining of which antenna to use is carried out only for weak signals and replaces the first AGC stage.

28. (Original) A method as recited in claim 18,

wherein at each stage,

the comparison for each section determines a respective setpoint error, and

the adjusting of each section includes determining a requested gain as the existing gain, produced by the current gain setting, minus the setpoint error from the respective comparison step, the adjusting including mapping the existing gain minus the setpoint error to a respective gain setting.

29. (Currently amended) A method as recited in claim 28,

wherein the result of providing a measure of signal strength for at least one of the sections ~~section~~ is used to update the gain settings for multiple selected sections of the receive path.

30. (Currently amended) An AGC controller to control the gain of a radio receiver for receiving packets of information, the receiver including:

a receive signal path including a plurality of sections, each section having an adjustable gain, the plurality of sections including a first section coupled to an antenna subsystem and a next section;

an analog-to-digital converter (ADC) coupled to the output of the last analog section in the receiver signal path to output a digital output signal; and

a signal strength measurer coupled to each section to provide a multi-bit measure of the signal strength at the section's output;

the AGC controller being configured to:

wait for a start of packet indication; and

accept multi-bit measures of the signal strengths from the signal strength measurers at the outputs of the first and next sections; and

adjust the gains of the first and the next sections using the accepted measures of signal strengths, the adjusting being to respectively set the signal strength at respective outputs of the sections to respective desired levels, in order to set the overall gain of the receive signal path,

such that the gain adjusting of at least the first section does not require using the digital output signal from the ADC.

31. (Original) An AGC controller as recited in claim 30, wherein the receiver includes a filter in the receive signal path, the signal strength measurer of the first section provides a measure of the signal strength at a point before the filter, and the signal strength measurer of the next section provides a measure of the signal strength at a point after the filter, such that the gain adjusting sets the first section's gain according to the accepted measure of signal strength at the output of the first section and sets the next section's gain according to the accepted measure of signal strength at the output of the next section relative to the accepted measure of signal strength at the output of the first section.

32. (Currently amended) An AGC controller as recited in claim 30, wherein the gain adjusting of the sections is carried out sequentially in respective sequential AGC stages, each sequential stage corresponding to and adjusting the gains of one or more corresponding sections, such that the ACG controller is ~~configure~~ configured to, after the start of packet indication, carry out a plurality of sequential AGC stages, each stage having one or more corresponding ~~section~~ sections, carrying out a stage including for each stage and corresponding sections:

accepting a measure of the signal strength at the end of the corresponding sections;

comparing the measured signal strength at the end of the corresponding sections corresponding to respective desired levels for the respective corresponding sections; and

adjusting the gains of the corresponding sections ~~according to~~ by a variable amount that depends on the respective differences between the respective desired level and the respective measured signal strengths for the respective corresponding sections.

33. (Currently amended) An AGC controller as recited in claim 32,

wherein the receiver is a superheterodyne receiver that includes in its receive signal path a first downconverter to convert a received signal at RF to an IF signal, a second downconverter to convert the IF signal to baseband, and a filter at IF between the first and second downconverters, the receive signal part further including a filter in the IF part,

wherein the receive signal path is including a pre-filter section before the filter, a post filter section after the filter, and a third section after the post-filter section,

wherein the plurality of AGC stages includes three stages, the first stage including setting the gain of at least the pre-filter section, the second stage including setting the gain of the post-filter section, and the third stage including setting the gain of the third section.

34. (Original) An AGC controller as recited in claim 32,

wherein for each stage:

the comparisons of each of the corresponding sections determine respective setpoint errors for each of the corresponding sections, and

the adjusting of each respective corresponding section determines a requested gain as the existing gain, produced by the current gain setting, minus the setpoint error from the respective comparison step, the adjusting including mapping the existing gain minus the setpoint error to a respective gain setting.

35. (Original) An AGC controller as recited in claim 34,

wherein the result of each section's measuring is used to update the gain settings for multiple selected sections of the receive path.

36. (Original) An AGC controller as recited in claim 34, comprising a finite stage machine configured to carry out the waiting and AGC stages.

37. (Original) An AGC controller as recited in claim 34, comprising a processing system programmed to carry out the waiting and AGC stages.

38. (Currently amended) An apparatus for controlling the gain of a radio receiver for receiving packets of information, the receiver including:

a receive signal path including a plurality of sections, each section including means to control the section's gain;

means for analog-to-digital converting coupled to the output of the last analog section in the receiver signal path to output a digital output signal; and

means for measuring a multi-bit measure of the signal strength at the section's output;

the apparatus comprising:

means for waiting for a start of packet indication; and

means for carrying out a plurality of sequential AGC stages, each stage corresponding to adjusting the gain of one or more sections, the means for carrying out ~~an~~ a sequential AGC stage including for each stage and corresponding sections:

means for receiving multi-bit measures of the signal strengths at the end of the corresponding sections;

means for comparing the measured signal strengths at the ends of the corresponding sections to respective desired signal strength levels for the respective corresponding sections; and

means for adjusting the gains of the corresponding sections ~~according to~~ by a variable amount that depends on the differences between the respective desired levels and the

respective measured signal strengths for the corresponding sections,

such that the means for adjusting the gains adjusts the gains of at least the first section without requiring use of the digital output signal.

39. (Original) An apparatus as recited in claim 38, wherein the receiver includes a filter in the receive signal path, the means for measuring at the end of the first section being at a point before the filter, and the means for measuring at the end of the second section being at a point after the filtering.

40. (Currently amended) A carrier medium carrying one or more computer readable code segments to instruct one or more processors of a processing system to carry out a method for controlling the gain of a radio receiver for receiving packets of information, the ~~receiver's~~ receiver including a receive signal path ~~being~~ including a plurality of sections and an analog-to-digital converter (ADC) coupled to the output of the last analog section in the receiver signal path to output a digital output signal, each section having an adjustable gain, each section providing a measure of the signal strength at its output; the method comprising:

waiting for a start of packet indication; and

carrying out a plurality of AGC stages, each stage corresponding to one or more sections, including for each stage and corresponding sections:

measuring the signal strengths at the ends of the corresponding sections to provide multi-bit calibrated signal strengths;

comparing the measured signal strengths at the ends of the corresponding sections to a respective desired signal strength levels for the corresponding sections; and

adjusting the gains of the corresponding sections according to the differences between the respective desired levels and the respective measured signal strengths for the corresponding sections, the adjusting being to respectively set the signal strength at respective outputs of the sections to respective desired levels, in order to set the overall gain of the receive signal path,

such that the gain adjusting of at least the first section does not require use of the digital output signal from the ADC.

41. (Original) A method as recited in claim 40, wherein the receiver includes a filter in the receive signal path, the measuring at the first stage being at a point before the filter, and the measuring at the second AGC stage being at a point after the filtering.

42. (New) A receiver as recited in claim 8,

wherein there are two or more post filter sections including the first post filter section and a second post filter section, the second post signal section including the analog to digital converter,

wherein the digital signals from the ADC provide a measure of the signal strength post-digitization to the AGC controller;

such that, after the first stage, the AGC controller can set the gain of the second post filter section according to at least the post-digitization signal strength measure.

43. (New) A method as recited in claim 15, wherein the desired levels are selected in order to maximize the signal-to-noise-and-distortion at the end of the respective stages.

44. (New) A method as recited in claim 18, wherein at least the first stage sets the gains of at least the first section in order to bring the input of the ADC to within the range of the ADC.